

CLAIMS

1. A magnetic thin film, characterized by being a polycrystalline film comprising:

5 Fe whose content is not less than 57.5 atomic% and not more than 94.5 atomic%;

10 one or more kinds of elements selected from the element group of Al, B, Ga, Si, Ge, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W and Rh, whose whole content is not less than 1 atomic% and not more than 15 atomic%;

15 N whose content is not less than 0.5 atomic% and not more than 10 atomic%; and

O whose content is not less than 1.5 atomic% and not more than 22.5 atomic%.

20 2. The magnetic thin film according to claim 1, which is a polycrystalline film made up of crystal particles whose mean particle diameter is not more than 15 nm.

25 3. The magnetic thin film according to claim 1, wherein a saturation magnetic flux density is not less than 1.6 T and an electric resistivity is not less than 30  $\mu\Omega\text{cm}$ .

4. A recording head which has a coil generating a predetermined magnetic field and a soft magnetic member magnetized by the magnetic field generated from the coil and which magnetizes an external medium by the magnetic field

generated by the coil and transmitted by the soft magnetic member, characterized in that

said soft magnetic member is a polycrystalline film comprising:

5 Fe whose content is not less than 57.5 atomic% and not more than 94.5 atomic%;

one or more kinds of elements selected from the element group of Al, B, Ga, Si, Ge, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W and Rh, whose whole content is not less than 1 atomic% and not more than 15 atomic%;

N whose content is not less than 0.5 atomic% and not more than 10 atomic%; and

O whose content is not less than 1.5 atomic% and not more than 22.5 atomic%.

5 5. The recording head according to claim 4, wherein said soft magnetic member is a polycrystalline film made up of crystal particles whose mean particle diameter is not more than 15 nm.

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6. The recording head according to claim 4, wherein said soft magnetic member has a saturation magnetic flux density of not less than 1.6 T and an electric resistivity of not less than 30  $\mu\Omega\text{cm}$ .

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7. A magnetic thin film forming method which forms a magnetic thin film comprising Fe, one or more kinds of

elements selected from the element group of Al, B, Ga, Si, Ge, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W and Rh, N, and O on a predetermined substrate by a sputtering process, characterized in that

5           in order that the content of Fe in said magnetic thin film may be not less than 57.5 atomic% and not more than 94.5 atomic%, the whole content of one or more kinds of elements selected from said element group in said magnetic thin film may be not less than 1 atomic% and not more than 15 atomic%, the content of N in said magnetic thin film may be not less than 0.5 atomic% and not more than 10 atomic%, and further the content of O in said magnetic thin film may be not less than 1.5 atomic% and not more than 22.5 atomic%,

10           the magnetic thin film is formed, while controlling the quantities and ratios of materials composing a target, the flow rate and gas mixture ratio of sputter gas, and the electric power applied to the target.

15           8. The magnetic thin film forming method according to claim 7, wherein during the formation of the magnetic thin film on said substrate and after the film formation, the temperature of said substrate is maintained at 200°C or less.